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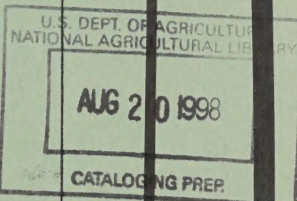


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# **A RESEARCH PERSPECTIVE**

**▲ Program  
Management**

**▲ Issue  
Identification**



NATURAL RESOURCE ECONOMICS DIVISION  
Economic Research Service--United States Department of Agriculture  
September 1971

United States  
Department of  
Agriculture



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PREFACE

Since August 1970, the Natural Resource Economics Division has operated under a new organizational arrangement. The new arrangement seeks to improve the management functions of the Division, allow flexibility in research assignments, encourage team efforts, and insure that Division staff periodically review research needs and issues of concern to the Division.

In the past year the staff of the Natural Resource Economics Division has been involved in an examination of mission and research objectives of the Division. Nine task forces were established to identify research issues in specified subject areas. Five working conferences, involving Washington and Field staffs, were held to discuss the task force reports. The staff interaction and discussion has provided a framework of research issues for problem areas of interest to the Division. This report is the product of this Division effort. Each member has had an opportunity to present ideas and discuss them. The appendix, with brief descriptions of research problems, is being distributed to staff members with this document. It is available to others on request.

The report was prepared under the guidance of the Office of the Director. Hugh A. Johnson of the Environmental Economics Branch served as recorder at the work conferences. He assisted in the preparation of this report and the appendix. Professor Mike Wirth, Washington State University, provided review comments and assisted in the preparation and editing of the report manuscript.

The part of the report relating to research needs will be updated periodically. Division staff are urged to study the document and use it as a base for ideas on future research proposals.

Melvin L. Cotner

MELVIN L. COTNER  
Director  
Natural Resource Economics Division

## I. INTRODUCTION

The U.S. Department of Agriculture's program for natural resource economics research is concerned with the economic and social aspects of the use, conservation, development, management, and control of natural resources. Major responsibility for these studies rests with the Natural Resource Economics Division, Economic Research Service, which carries out national and regional programs of research, planning studies, and program and policy assistance.

The purpose of the report that follows is to present an overview of the objectives, methods, and scope of the Division's operations. The report describes the Division's work missions, organization, methods of management, current programs, and its collective thinking on some emerging issues in the field of natural resource economics.

The report is designed to be useful to those who use the research and services provided by the Division, those with whom the Division cooperates, and those in the parent organization--Economic Research Service, USDA--who have the final responsibility for guiding the Division's programs and funding.

This report is also intended to help improve communication and understanding among the Division's staff concerning the range and interrelationship of the Division's activities.

The report is organized to describe the functions of the Division. Figure 1 illustrates these functions and serves as an outline for the report. The subject matter shown in the functional boxes are presented in sequence below.

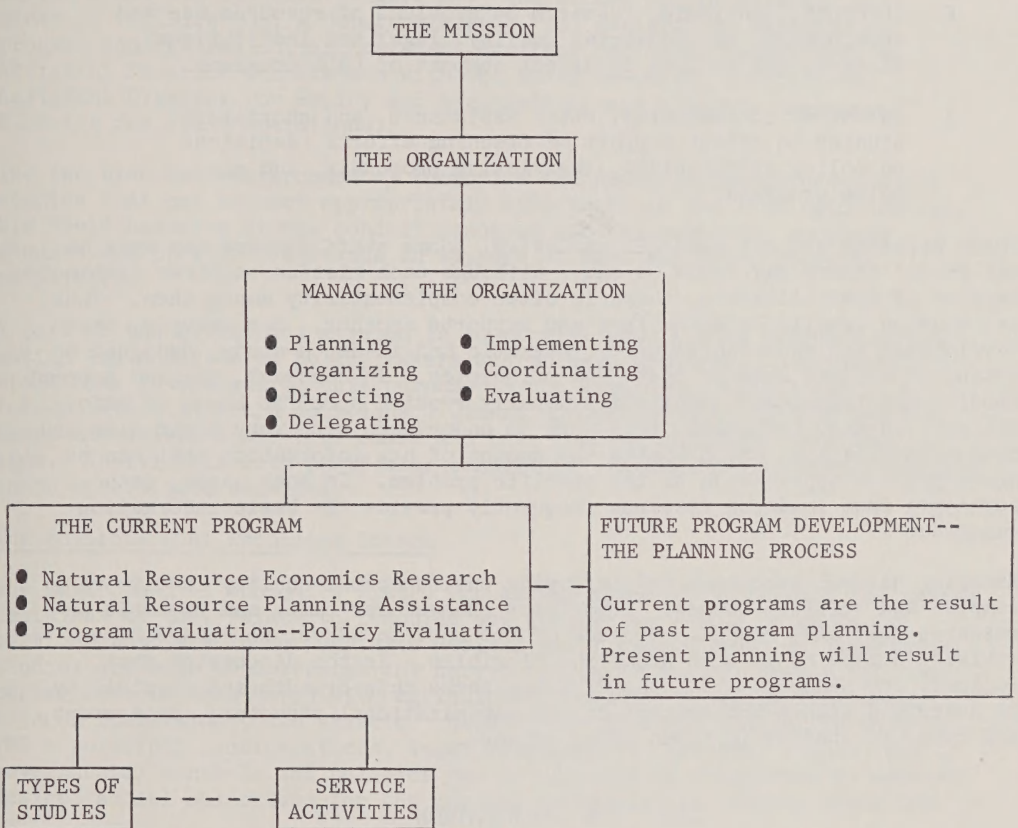
## II. THE MISSION

The basic mission of the Natural Resource Economics Division is to conduct national and regional programs of research, planning assistance, and technical consultation on economic and institutional factors and policy relating to the use, conservation, development, management, and control of natural resources. The primary emphasis in these programs is on problems of resource management, both national and regional, as they pertain to policy and program responsibilities of the Department of Agriculture. But beyond these responsibilities, the Division serves as a basic source of information to all interested agencies and individuals.

Within the framework of these broad responsibilities, the specific missions of the Division are defined as:



Figure 1: Functional Relationships within the Natural Resource Economics Division



1. Collection, compilation, systematic analysis, and projections of information relating to the management and use of natural resources.
2. In-depth, continuing research on problems of resource use and development, environmental quality, legal and institutional factors, and studies in direct support of USDA programs.
3. Technical consultation, staff assistance, and short-term studies in direct support of planning efforts, decisions on policy alternatives, legislative proposals, and on-going programs.

These missions are not mutually exclusive. Some staff members may work on all three; others may focus on one. Although each mission requires distinct degrees of specialization, there is often complementarity among them. Thus, one mission usually benefits from and supports another. For example, data development and research require systematic and in-depth study, designed to establish a broad base of facts and principles. In contrast, program support studies and technical consultation usually require specific kinds of information. In many instances, this work is undertaken with very tight time and budget constraints, which limits the amount of new information that can be developed for application to the specific problem. In such cases, data developed from in-depth research frequently provide the basic information required.

Managing natural resources and improving environmental quality involve many complex and critical issues. Priorities change over time, and emphasis on research must also change. Because of the need to adjust to change, the Division's mission is both broad and flexible. In the discussion that follows, the means by which the Division seeks this breadth and flexibility is described within the context of its organizational structure, management, and types of studies in broad areas of work.

### III. THE ORGANIZATION

The broad scope and multidisciplinary nature of the Division's mission requires an organizational structure that encourages the development of competence that is specialized, yet sufficiently flexible to permit the shifting of staff assignments in response to changes in research emphasis.

The research and planning assistance program is under the guidance of two Washington-based branches and six Field Resource Groups. The branches and Field Resource Groups contribute toward each of the Division's three missions. About 40 percent of the staff are officed in Washington.

### The Organization's Components

The Washington-based portion of the Division includes an Office of the Director and two branches (Figure 2). The Office of the Director consists of the Director; a Deputy Director, who assists the Director in program administration; an Assistant Director for Field Operations; an Assistant Director for liaison with the Water Resources Council; an Assistant Director for Policy and Legislation; and a Deputy Assistant Director for Field Operations.

The two branches--Environmental Economics and Resource Economics--conduct studies that can be most appropriately undertaken in the Washington office. Six Field Resource Groups conduct resource and environmental economic studies and provide assistance in support of land and water planning activities.

A part of the Division's mission is to provide specialized resource information and analyses to policy makers and program planners. Considerable staff time is devoted to this purpose in the Washington office and to a lesser extent at field locations. Others throughout the Division perform short-and intermediate-term staff and task force assignments from time to time. Individuals with particular competence and experience usually provide these specialized services.

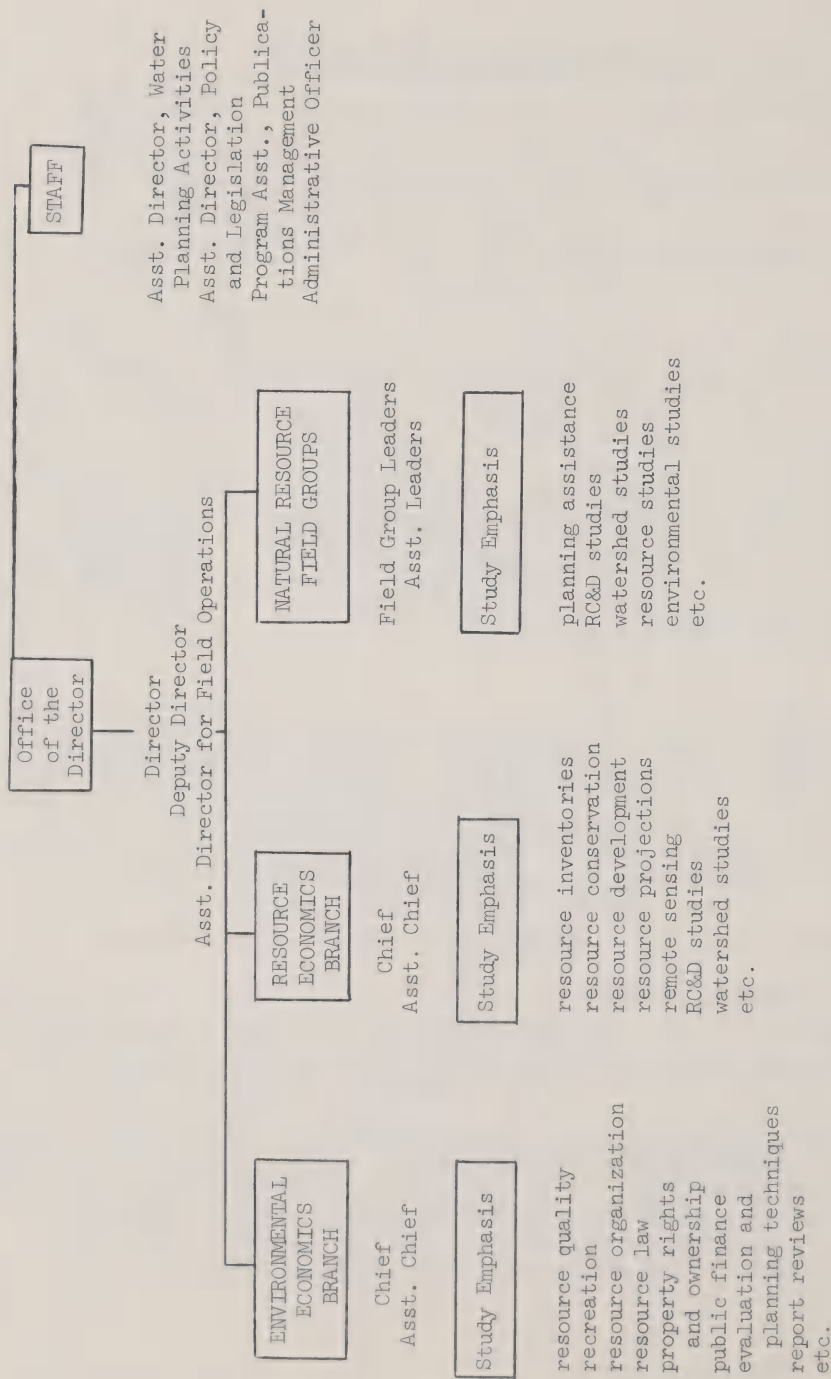
#### The Environmental Economics Branch

The Environmental Economics Branch emphasizes research on private and public decisions as they relate to resource use for the provision of goods and services that are in harmony with desired environmental quality objectives. Studies are made to determine the nature and incidence of adverse environmental effects associated with agricultural pollutants and of alternative ways of minimizing these effects. Studies are directed toward the ways in which political considerations, legal arrangements, property rights, and governmental controls and policies can be directed or formulated to achieve desired social objectives for the use and management of natural resources.

#### The Resource Economics Branch

The Resource Economics Branch relates broadly to problems of resource allocation among competing uses, and the ways in which resources can best be combined to meet the nation's needs. The branch is responsible for developing inventories of quantities and qualities of resources which constitute essential basic data for economic analyses. The branch is also responsible for development of data systems and retrieval activities within the Division. Also included in the branch responsibilities are developing basic tools for resource use projections as a basis for long-term planning, analyzing the effects of interregional competition, and developing analytic tools for macro-type evaluations of alternative programs and policies in resource development and management.

Figure 2: Organization of Natural Resource Economics Division





### Field Resource Groups

Field studies, conducted by the Field Resource Groups, are undertaken as a part of the total Division program of research and planning assistance. The Groups assist in initiating and implementing a coordinated field research program, including studies relating to river basin planning assistance, RC&D, and P.L. 566 watershed programs, and associated field research concerned with resource use and environmental economics. Individual Field Group Leaders have direct responsibility for initiating and implementing the program.

### Cooperation within the Organization

Cooperation among the various organizational units is based on both formal and informal relationships and cross-responsibilities within the Division. Although Field Group Leaders have overall responsibility for the conduct and supervision of research projects, in many cases, because of responsibilities in subject matter, one or both of the branches work closely with the field staff members. In other cases, senior staff, both in Washington and in the field, assume technical responsibility for studies in which they are uniquely qualified. Branch Chiefs and Field Group Leaders may also serve in this capacity, their responsibilities varying with the circumstances of each case.

### Cooperation with other Agencies

At both the State and Federal level, cooperation of the Division with other agencies has developed over time in carrying out programs in which there is mutual concern and overlapping responsibilities. For example, the Division's cooperation with the Soil Conservation Service is guided by work plans delineated under memoranda of agreement. Many of the staff members in the Field Resource Groups are stationed at Agricultural Experiment Stations throughout the land-grant college system. Thus, some of the Division's studies conducted at these locations are done cooperatively with Experiment Station personnel under memoranda of agreement. In other cases, cooperation develops on an informal basis simply because of common research interests between Experiment Station and Division researchers.

In many ways, these cooperative arrangements provide an important input toward the accomplishment of the Division's mission. Experience has indicated that they mutually reinforce the research programs of both the Division and those agencies and individuals with whom it cooperates.

## IV. MANAGING THE ORGANIZATION

The Division is basically a research organization whose function is providing information and knowledge concerning a broad range of natural resource issues. Because research is, in the main, a process of systematic inquiry by qualified scientists, the basic unit of concern to management must be research workers, and the most effective use of these talents in accomplishing the objectives of the organization.



The core problems of managing a research program can be classified as follows:

1. Providing a work environment that is conducive to the effective conduct of research.
2. Devising a systematic method of establishing priorities for research projects and activities.
3. Coordinating the research activities to assure appropriate program breadth and focus within the organization's responsibilities and resources.
4. Changing the direction and foci of research programs in response to emerging issues and needs.

### The Division's Management Program

The Division's approach to the solution of these management problems is through a separation of job responsibilities, as indicated in Figure 3. The first major responsibility is the management of the Division's current program. The second is the development of future programs. These two major tasks are closely related--the Division's current program is largely a product of past program planning; future program planning will be primarily shaped by the results of current work.

### Managing the Current Program

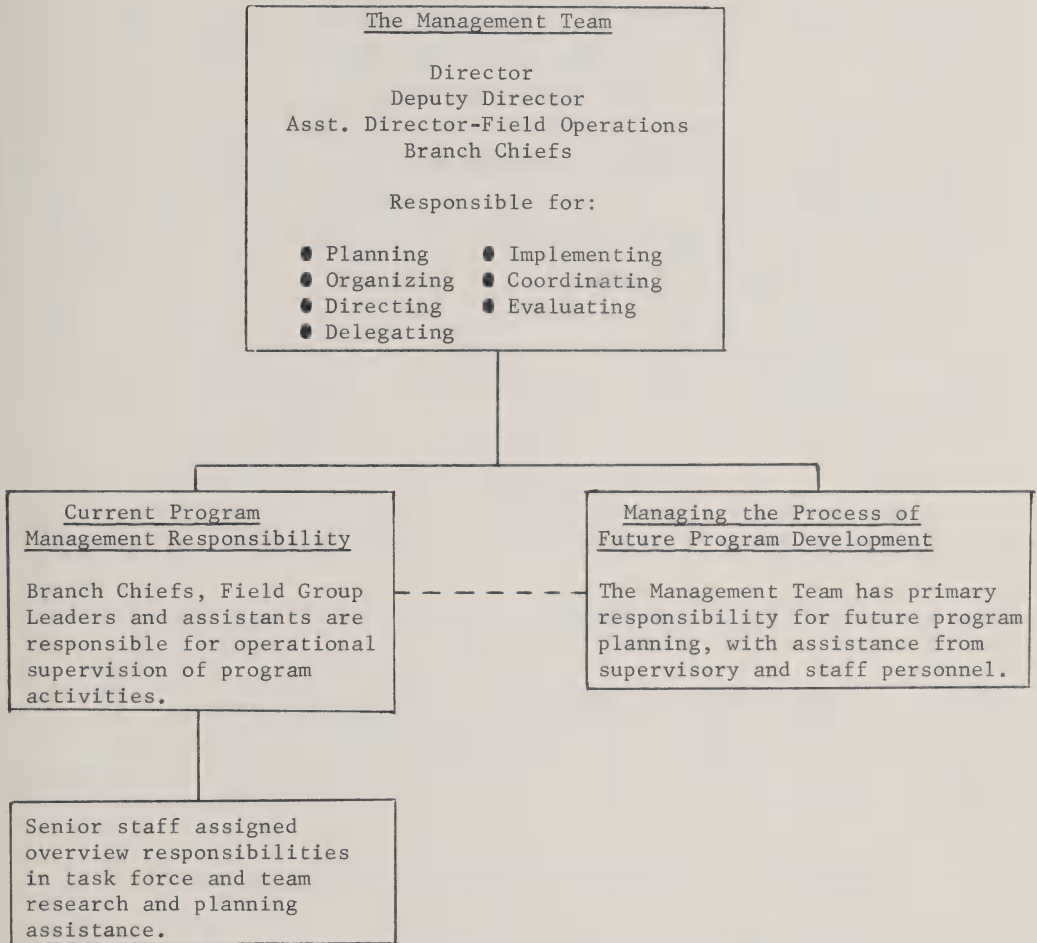
Overall management of the Division's current program is provided through the Management Team, chaired by the Division Director. This team includes the Deputy Director, the Assistant Director for Field Operations, and the two Branch Chiefs. Its principal functions are planning, coordinating, and evaluating staff activity on the research and planning assistance missions of the Division.

The Branch Chiefs and their assistants perform administrative and supervisory functions. In the case of field operations, Field Group Leaders and their assistants carry out this role. These administrative personnel also have principal responsibility for leadership and coordination of program efforts within their areas of primary concern.

Senior staff, who do not normally engage in administrative work, are occasionally asked as part of their regular assignment to provide leadership and coordination of research and planning assistance projects in their field of special competence.

From time to time, outside consultants are retained to provide special expertise on research and planning assistance problems.

Figure 3: The Division's Management Process



### The Importance of Individual Staff Members

The general problems associated with managing a research organization such as this Division differ significantly from those encountered in a typical line organization. Research--because it is basically an enterprise of discovery--can only be performed effectively by highly skilled perceptive individuals, motivated toward professional excellence. Accordingly, the Division's program must embody a wide latitude of flexibility in its approach to research and planning assistance, so that each staff member is given an opportunity to use his talents to the fullest extent within the Division's overall mission. In this regard, the Division is fortunate in having a highly qualified staff, many of whom have national reputations in their special areas of emphasis.

Interdisciplinary approaches and team efforts are becoming increasingly important to the Division's program. In addition to their individual project assignments, staff members frequently participate on interagency committees and task forces set up to study special problems, prepare procedural guides for agency use, and develop policy statements. Such assignments often closely complement the special work areas of staff members who serve in these capacities. Moreover, experience indicates that such involvement can be both interesting and rewarding, since it offers the individual an opportunity to broaden his perspective through contact and other disciplinary concepts and points-of-view.

Proposed legislation often is reviewed in this Division, as are water resource projects proposed by public agencies.

Work is not always limited to regional and national problems. Staff members occasionally represent the United States at international conference or provide material for use at such conferences, or carry out specialized technical assignments abroad under arrangements with other U.S. or international agencies.

### Managing Future Program Development--The Planning Process

#### The Imperative of Future Program Planning

Most of the public issues concerning natural resources are dynamic and complex, with multi-dimensional, interacting elements and ramifications. Each issue involves a complex of social values and goals, and each has space, time, and structure dimensions. The study of these issues and their alternative solutions must include these components and their interactions, and must make an accounting of both the direct and indirect benefit-cost ratios. Natural resources research demands the use of modern analytical techniques, common sense, and problem-resolution acumen, and it requires program planning.

Natural resources research planning requires the involvement of professional researchers and practitioners, as well as business, professional, and government leaders in the relevant fields of endeavor. Such planning must be comprehensive, futuristic, and relevant in order to produce useful and timely information.

A key requirement of planning research on natural resource problems is that the research be designed to produce information that is sufficiently imaginative and comprehensive to identify the key elements and ramifications involved in the utilization of natural resources, and that the research be employed with sufficiently sophisticated expertise to raise the right questions in specialized areas. The program planning function must have the capability of simultaneously looking in three directions: (1) To the USDA and other agencies that are directly served, (2) to both the social and physical environments that shape the issues, and (3) to the scientific knowledge that explains the environment. This function must also have the capability of speaking two languages--that of the layman and that of the research scientist.

#### The Division's Approach to Future Program Development

The Division's objectives for forward program planning are guided by the following basic considerations:

1. The Division must be capable of adjusting its programs to the highest priority research, planning, and service activities within its defined mission.
2. The Division must be capable of sensing, identifying, and conceptualizing emerging issues, problems, and opportunities.
3. The Division must maintain an innovative structure, building programs and budget support for new areas as old programs are completed or realigned.
4. Forward planning must be a continuous process.

The Management Team is the principal steering mechanism by which the Division plans its future program. In performing this role it draws upon a broad range of inputs; most important among these are:

1. From the Economic Research Service, the Division's parent agency, through its annual reviews and up-dating of budgetary requests.
2. From the Division staff as they identify emerging issues concerning natural resource use, and their thinking concerning the implications for the Division's program.
3. From agencies and individuals with whom the Division cooperates.

4. From information developed through a wide range of scientific disciplines that yield research on natural resource problems.

The Management Team reviews all research, planning assistance, and related proposals, and establishes priorities among them. It also examines specific proposed objectives, methodology, research approaches, and other details to help orient studies toward the major issues of concern to the Division's mission. This procedure permits the mutual development of study efforts by the Division's administrative leaders and staff. The review effort also serves to coordinate the Division's program. Approved study objectives and plans are distributed throughout the Division in order to facilitate review and comment by Division staff. Subsequent discussions between the Management Team and staff facilitate communication of ideas and assistance in arriving at final program decisions.

The current status of the Division's work on future program development is reported in detail in Section VI of this report.

#### The Professional Development of Staff and the Division's Future Programs

The Division's ability to continue to effectively perform its mission depends in the final analysis on the professional capabilities of its staff. Although initial training and subsequent experience are important in building this capability, staff members need continuous professional renewal in order to keep abreast of developing research methods, techniques, and disciplinary knowledge. With this purpose in mind, each staff member is encouraged to prepare a plan for professional development through additional education, broadened experience, and special training. Division policy has been and continues to be one of assisting staff in obtaining additional education. Each situation is examined individually. In-service training needs are matched against staff assignments and available funds. The younger and less experienced professionals at field locations also are encouraged to accept tours of duty at the Washington headquarters, to complement their experience in the field and to broaden their work experience. Professional needs for status are recognized, and staff members are encouraged to join professional societies.

#### V. THE CURRENT PROGRAM

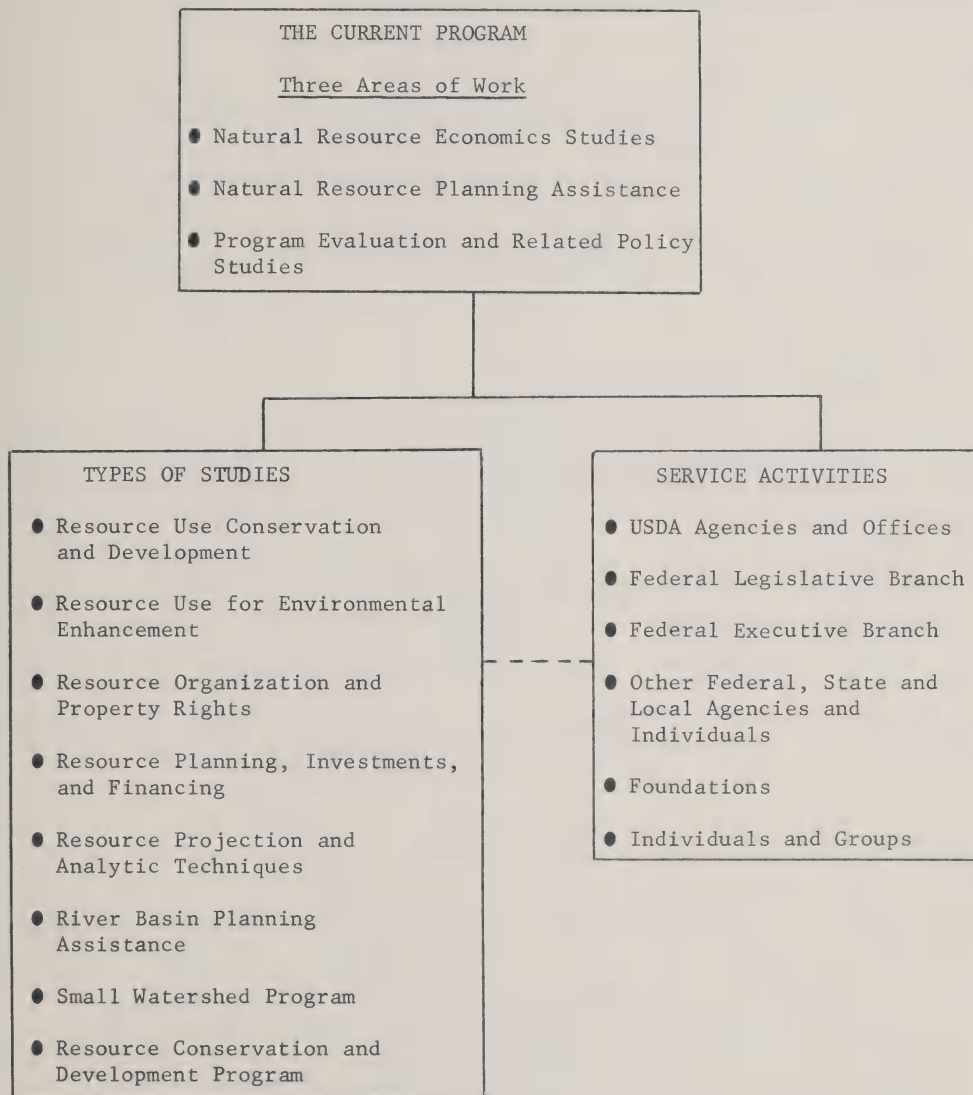
The Division's current program is carried out in three broad areas of work, each related to the overall mission and each involving a multidisciplinary approach in at least some of its dimensions.

Activities conducted within these three work areas include eight different types of studies, as well as a variety of service assignments.

The nature of the work areas and their relationships to component types of studies and service activities are shown in Figure 4.



Figure 4: Components of the Current Program



## Areas of Work

### Natural Resource and Environmental Economics Studies

Natural resource and environmental economics studies include all Division research projects that are documented in the USDA's Current Research Information System (CRIS). The subject coverage is wide. It includes economic appraisals of resource use, viz. resource allocation among competing uses, inventories of land and water use, use of analytical and projection systems, institutional studies of land resources, water use and management, resource laws, zoning ordinances, land planning organizations, land ownership, recreation and open space, resource quality, and impacts of resource use on the environment. Studies are carried out at field locations and in Washington, D. C. Most field staff in this area of work are stationed at land-grant institutions, and carry out cooperative research with university staff.

### Natural Resources Planning Assistance

The Division's work in natural resources planning assistance consists primarily of providing information and analyses for comprehensive water and land resources planning, conducted under the overall guidance of the Water Resources Council. This includes (1) river basin planning assistance--carried out principally at field locations; and (2) National Interregional Analysis and Projections (NIRAP)--carried out mainly in Washington, D.C. These studies are budgeted with funds appropriated to the Soil Conservation Service and transferred to the Division under a memorandum of understanding

NIRAP studies, planned and implemented in cooperation with the Office of Business Economics, Department of Commerce, are prepared for use in river basin planning and national assessments of water use problems. The Division is the only unit of the Economic Research Service that is currently engaged on a continuing basis in water resource planning assistance.

### Program Evaluation and Related Policy Studies

Current program effort in this area of work includes watershed evaluations and studies in support of the Resource Conservation and Development Program (RC&D). Both types of activities are planned jointly with the Soil Conservation Service and are carried out with funds that SCS transfers to the Division for these purposes. Watershed studies have been conducted since 1955. They include inventories of watershed work plans, evaluations of pilot watersheds, flood damage surveys, assistance on developing Department policy, and studies of economic problems relating to the performance of small watershed projects. RC&D studies have been carried out since 1964. They include technical assistance to local project sponsors, and economic studies of development measures.

Other work in this area of program evaluation includes short-term special studies and task force activities relating to natural resource economics and policy problems. These assignments are referred to the Division from the Administrator of the Economic Research Service, the Secretary's Office of USDA, or other Federal agencies.

### Relating Areas of Work to Funding and Types of Studies

Each of the three broad areas of work presents a different situation in planning, funding, and carrying out the studies. Yet, there is a good deal of complementarity among them. For instance, under the natural resource and environmental economics area of work, the Division is interested in analyzing alternative regional land use patterns in relation to supply and cost of agricultural production, costs of conservation measures, and net farm income. But under certain circumstances, work in the planning assistance area may offer excellent opportunities for such studies as part of a package; or in some cases may develop, as spin-off, information that is very useful in natural resource and environmental economics studies. It is also true that information developed in natural resource and environmental economics studies is often a crucial input in achieving planning assistance objectives. Studies in the work area of program evaluation and policy draw upon knowledge developed in the other work areas, but they also effect reciprocation by helping to identify emerging issues and research problems.

In FY 1971, the Division operated on a budget of \$3.1 million. Natural resources planning assistance accounted for slightly more than half of the total program funding. Natural resource and environmental economics studies involved about one-third of the program budget. Program evaluation and related policy studies involved about 15 percent.

### Type of Studies

Although each of the Division's eight types of studies has a unique focus, all types share a commonality in the broad questions toward which they are directed. Each is oriented around problems encountered in resource management in (1) providing public goods, (2) ameliorating conflicts of resource use that require joint actions by several resource managers or several communities, (3) reducing adverse consequences of particular resource uses to other resource owners or communities not parties to the use decision, and (4) transfer of ownership interests in natural resources.

All studies are multidisciplinary in approach, at least in some aspects, because of the multifaceted nature of resource-use problems. They are also alike in that they require the researcher to take a long-term frame of reference, consider a wide range problem solution, and trace through the likely consequences of resource-use decisions on all affected parties.

Many of the studies are performed in cooperation with State agencies (including agricultural experiment stations) and with regional research committees, other agencies of the Department, and other agencies of the Federal Government. Projects are occasionally carried out under contract with private research firms.

The setting, purpose, and scope that typify each of the eight types of studies are briefly discussed below. Five of the study areas are related to broad subject areas in the natural resources field. Three relate to natural resource-related programs of the Department or the Federal Government. None of the eight is mutually exclusive, but the nature of the resource problem, resource program, or source of study funds suggests the delineation used.

### Resource Use, Conservation, and Development

Population, growth, urban expansion, advances in production technology, and changes in social values present a set of dynamic conditions that affect both the demand for and supply of services provided by natural resources. These changing conditions require analyses on a broad range of topics to assist resource management decision-makers--in both the private and public sectors--determine the best means of conserving, developing, and using resources to best enhance the well-being of society.

The Division's studies on these problems have focused on analyses of rural-urban land use shifts, economics of water management on farms, irrigation trends and development potentials, and evaluations of benefits and costs of conservation practices and programs.

### Resource Use for Environmental Enhancement

An expanding population and an increasing per capita consumption of goods and services in the United States are placing unprecedented demands on our natural resources. Through advances in technology, man has become increasingly able to meet these demands, but in the process he has generated adverse environmental effects. Some agricultural production practices--such as feedlot operations, pest control, or crop fertilization, and numerous other nonfarm resource uses--may cause significant damage or are potential hazards to the environment. Similarly, as the nation has become more affluent and leisure time has increased, the demand for open space, scenic areas, outdoor recreation, and other public goods has increased. And in most cases, the enjoyment of public goods is closely related to the environmental situation in which these public goods are provided. Thus the question of environmental quality has become an important public issue.

Current Division activities in this area of work provide subject-matter expertise and economic information on a broad range of environmental problems. Studies are currently underway on: alternatives for reducing animal waste pollution from feedlots; the pollution effects of using agricultural chemicals; legal and institutional alternatives for improving water quality; outdoor

recreation enterprise and industry structure; strip mine reclamation; the potential for new town development; and the use of satellite remote sensing technology for assessing environmental problems. Previous studies have considered open space, esthetics of the environment, and the economics of salinity.

### Resource Organization and Property Rights

Natural resources, with their limitations of supply, are an economic fulcrum for the production and distribution of the nation's goods. Because of the fixity in supply, the rules established for their use and conservation acquire special significance. Resources are used within a complex set of institutions, involving constitutional authorities as well as Federal and State administrative regulations. These property rights and laws determine who is to have or be denied the use of the resource, and who claims the benefits from or bears the costs of resource use. Social and governmental organizations are under constant pressure to adjust to technological developments and to the changing social views of man's desired means and ends. Similar pressures are exerted on the ethical, religious, social, and legal rules governing economic and social behavior.

The Division's studies of this nature include water allocation and administration under the appropriation doctrine of the Western States, water allocation and administration under water quality law, rural zoning and land use controls, special districts and authorities, land ownership and tenure, incidence of benefits and costs of Federal spending programs, and land use planning.

### Resource Planning, Investment, and Financing

The source, nature, and level of public financing greatly influence natural resource use and development decisions. Planning is implicit in all resource development decisions, and is specifically required for development programs or projects approved by the Congress. Public finance considerations are particularly important in determining project feasibility, as well as project acceptability by local and regional interests. Financial measures and requirements are crucial in determining the best alternatives for resource use. Sources of financing, cost sharing, and repayment policy also bear heavily in determining which programs are actually carried out. In addition to explicit planning and financial requirements, many other Federal programs--such as tax exemptions or manpower training acts--may have far-reaching and unanticipated effects on development decisions.

The Division conducts studies to improve the procedures available to planning agencies in evaluating the benefits and costs of program or development alternatives. In some cases, these studies are based on data from completed projects.



## Resource Projections and Analytic Techniques

Policy makers are placing increasing stress on anticipatory decision-making as the only means of keeping abreast of a continually changing world. For a research agency, this means that data inventory functions alone are not enough. In response to this need for decision-making, a part of the Division's efforts are devoted to projecting future resource needs, supplies, and development levels. The Division is developing both analytical and projection capabilities within the National Inter Regional Analysis and Projections (NIRAP) program, and with the regional linear programming and input-output river basin planning models. The Division also conducts studies in photo interpretation, remote sensing, and systems simulation, as well as the more conventional statistical techniques.

## River Basin Planning Assistance

Division personnel represent ERS, in a team effort with the Soil Conservation Service and the Forest Service, in the preparation of USDA-State cooperative river basin plans for developing water and land resources to meet long-term agricultural, forestry, and environmental needs. Under the guidance of the Water Resources Council, this USDA team also cooperates with other Federal departments and State agencies concerned with natural resource management in preparing coordinated, comprehensive plans for development of water and land resources in selected river basins. The Division's primary responsibility is to provide economic information and analyses pertaining to public decisions in implementing comprehensive river basin plans.

In addition to studies directly supporting river basin planning, Division staff also participate in many committee efforts and special studies--both regional and national. Continuous liaison activities are maintained with the Water Resources Council to assist the Council in integrating economic analysis in the formulation and evaluation of resource development plans prepared under its guidance. Over the years, considerable staff time has been devoted to assisting the development of planning objectives, criteria, and procedures. Development of a national-interregional agricultural production and land use projection system has been an important activity of the Division.

## Small Watershed Program

The Division assists the Soil Conservation Service in the P. L. 566 Small Watershed Program. Special studies are conducted of economic and related issues that bear directly on problems faced by SCS on planning, formulating, and operating watershed projects.

Other Division activities relating to these studies include: participation in developing USDA policy recommendations, evaluations of pilot watersheds,

surveys of flood damage, evaluation methodology for recreation and irrigation benefits, studies of local financing and organization, inventory of watershed work plans, and participation in economic workshops.

### Resource Conservation and Development

The Division carries out special studies of economic and related issues to assist the Soil Conservation Service in administering the Resource Conservation and Development Program (RC&D). Under this program, local communities are assisted by SCS in developing and implementing a plan of action for land conservation and utilization in order to expand the economic opportunities for people in the area. The Division ordinarily does not participate directly in planning individual projects.

Results of Division studies provide a partial basis for plan formulation and evaluation of project effects. Studies carried out have included participation in preparing national guides for economic standards, selection of project areas and evaluation of project measures, participation in project planning, inventory of project plans, methodology development for evaluations, analysis of local organization and financial arrangements, and appraisal of installed projects.

### Service Activities

The Division is frequently asked for information and analysis related to any one or several of its areas of work or types of studies. The work undertaken in response to these requests is classified as service activities.

Some requests relate to information on land-use patterns, for which data are readily available in Division files. Others concern questions on emerging issues in the resource-use or environmental fields, for which little or no specific information is available at the time of the request.

Although these activities constitute an important part of the Division's program, they are not funded or organized as separate activities. This is so, simply because they are so diverse and are, in essence, adjunct components of each of the Division's defined areas of work and types of studies.

The clientele served by these activities includes USDA agencies, the legislative and executive branches of Federal Government, and other agencies and individuals.

A brief overview of some of the Division's service activities follows.

### Review of Resource Development Proposals

An important service activity is the review of feasibility reports to authorize water resource development projects. Proposals for construction of projects are developed by the Corps of Engineers and the Bureau of Reclamation. The Division staff reviews these project proposals to evaluate their economic aspects, including the effects of the proposed projects on land and water use, level and distribution of income, and environmental quality.

### Review of Environmental Impacts Analyses

Since 1970, agencies making proposals for construction of resource development projects are required by law to submit a statement describing the effect of the project on the environment. Many of these statements are referred to the Division for review.

### Review of Reports and Studies

Reports of the interagency comprehensive river basin studies reviewed in the Division include a summary report on each study, with appendices on land and water resources, economic studies, flood protection, drainage and irrigation, recreation, fish and wildlife, water quality control, electric power, and navigation. The purpose of these reviews is to make suggestions on the economic aspects of the reports and their various appendices. Particular attention is given in the review process to reports in which the Division had a direct input through its planning assistance staff.

### Analysis of Legislative Impacts

Legislative documents reviewed in the Division usually concern proposed legislation affecting natural resources. Requests received in the Department from Congressmen, either as individuals or as chairmen or members of Congressional Committees, are forwarded to the Division if they fall within the scope of the Division's work. The objective of these reviews is to provide information on the potential impact of the proposed legislation on the use of resources and the economic consequences to resource owners and the public, and to provide such other related information as the Congressmen may request.

### Program Advice

Division staff assistance on policy and program development includes evaluating alternatives as they affect natural resources. These programs cover such issues as land-use policy and programs designed to enhance environmental quality. The Division is occasionally asked for advice on modification of

programs of other agencies within and outside USDA. Programs such as cost-sharing for conservation practices or Federal assistance in providing flood protection are modified from time to time, and the Division provides advice on the impact of these modifications.

### Data Inventories

The Division also maintains basic data inventories on major land uses to reveal trends in land use; summarizes census information on resource-use problems; and compiles inventories on the extent and consequences of public resource development programs.

## VI. FUTURE PROGRAM DEVELOPMENT--THE PLANNING PROCESS

Every organization, to remain relevant and dynamic, must assess its program and its position periodically. New situations require new policies; new problems require new solutions; new interests require new balances within an overall program. Thus, the development of viable future programs requires the use of a systematic and continuous planning process.

Section III presented an overview of Divisional planning as a part of the management function. This section presents in brief outline a format of the Division's planning process. This is followed by a discussion of some of the intermediate outputs of this process.

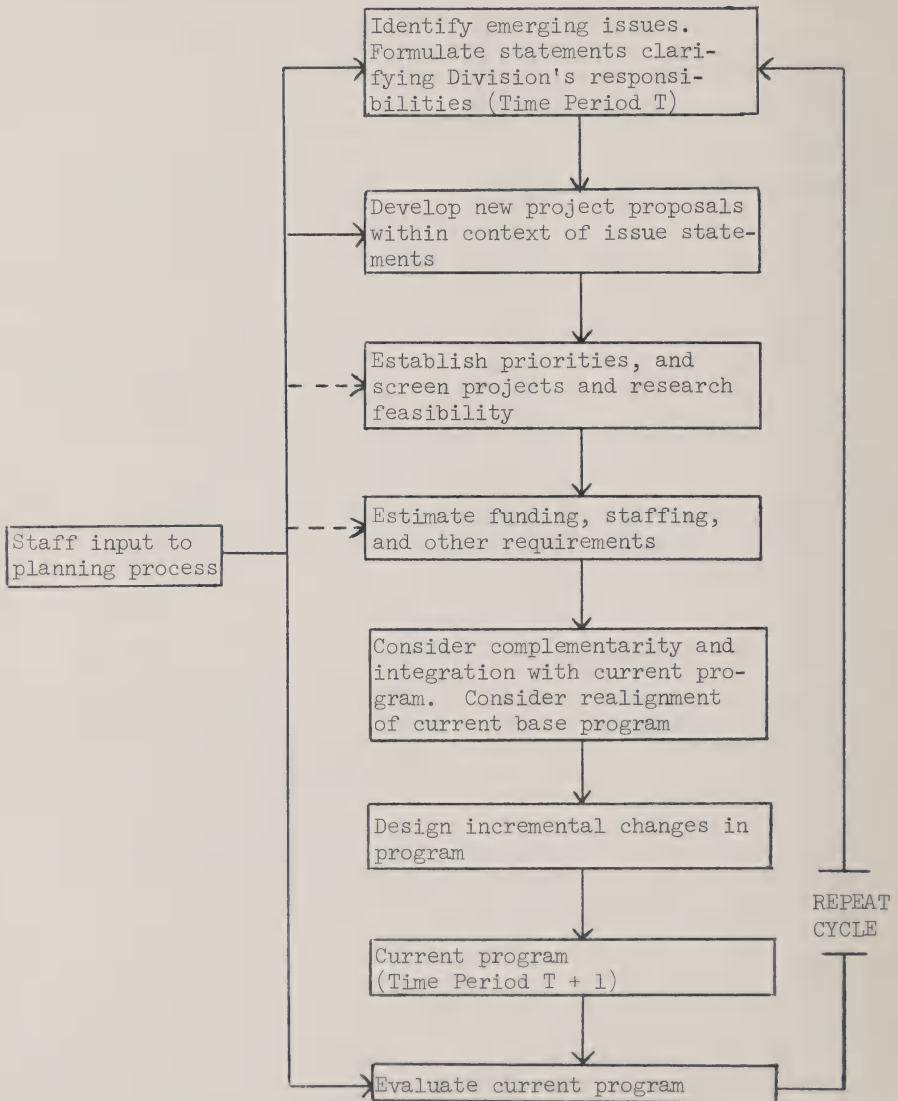
### Format of the Division's Planning Process

The detailed characteristics of an effective planning process vary among organizations, depending on the form of organization, management methods, mission, and other circumstances. The Division, through its experiences in program planning, has found the planning format indicated in Figure 5 to be effective.

The planning process is the steering mechanism that operates at the leading edge of the Division's program. Initiation and guidance of this process is one of the primary functions of the Management Team.

The program decisions that the planning process is designed to resolve are multifaceted and complex, yet the process itself is quite simple. The Management Team initiates the process by encouraging staff inquiry into the identification and analysis of emerging issues in the resource use field. This step is followed by staff development of position papers on issues, which then leads to formulation of project proposals within the context of these issues. Proposals are then screened by the Management Team, which considers their feasibility for adoption in relation to availability of funds and the complementarity and realignment with respect to the current program. The planning process culminates with the development of a revised program. The program, thus reconstituted, is subsequently subjected to evaluation, and a new planning cycle begins.

Figure 5: Generalized Steps by the Management Team to Review, Guide, and Initiate Changes in the Division's Program





The Division's planning process provides an effective set of guidelines for developing future programs. But, in some instances it is necessary to make program changes with less studied consideration. This is true, on occasion, for certain urgent, high-priority new assignments or program modifications.

### The Current Planning Cycle

The current planning cycle began during mid-1970, with the appointment of nine task-groups to identify important emerging issues in the resource use field. Reports from these groups were compiled in a draft document entitled, "Policy Issues and Research Needs Facing the Natural Resource Economics Division." The draft was made available for review in November 1970. Subsequent staff conferences and further suggestions resulted in the articulation of 82 different research ideas within the framework of two broad issues.

While planning must be a continuous process, the in-depth staff input, as represented by the task-force approach discussed above, is not expected to occur on a continuous basis. It is anticipated that such efforts will occur at 3-year intervals, although the exact timing must necessarily remain flexible.

### The Issues

Issues are the effect or consequence of situations concerning people. A broad issue involves multiple, smaller, and often interrelated problems--many only indirectly relating to quality and quantity of available natural resources. Problems change more frequently than do the broader issues.

The actual issues selected in developing the issue papers represent staff consensus about major social topics of research concern to the Division. Problem examples cited for each issue area reflect the Division's orientation in research, program support, and service activities.

#### 1. Development and Management of Natural Resources

The country's population increased one-third from 1950 to 1970. It is expected to increase another third by the year 2000. Total consumption of food and fiber doubled during the last two decades. Total demands for consumption are expected to more than double by the year 2000. Urban development, pressed by population and abetted by easy transportation, has spread around older communities and extended into new areas on formerly rural land. Most of the population growth during the last 20 years occurred in the rural-urban interface. During the 1960's, population increased 27 percent in metropolitan areas outside the central cities. Elsewhere, it increased only 2 percent. This concentration of people, together with their increased purchasing power, has intensified the demand for rural open space and for recreational services.

Space and the related land resources are presently inefficiently used. A third of the nation's land is cropland and a third is forest, but the people are concentrated in our Standard Metropolitan Statistical Areas (SMSA's) on less than one-tenth of the country's total land. In much of rural America outside SMSA's, continuing depopulation makes the support of viable community services and job opportunities increasingly difficult.

Demand for recreation in rural areas continues its rapid upward climb. The National Park Service recorded 175 million visits in 1970. An estimated 50 million campers will be competing for 690,000 campsites during 1971. Recreation areas and recreation opportunities are poorly distributed in relation to the concentrations of population, in spite of the fact that much open space and forest land remains available close to cities.

Other adverse effects on the rural economy include (1) surface mining, which has ravaged an area the size of Delaware and by the year 2000 will involve an area the size of Maryland; (2) reclamation programs on 1.3 million acres annually, often with little regard for ecological impact; and (3) cropland abandonment at the rate of 2.7 million acres annually, much of it in or near metropolitan areas where the land might be used for open space, recreation, or planned urban development.

Millions of other acres also are affected by development of facilities for power, flood control, navigation, drainage, and recreation; for the construction of new highways and airports; and for urban development. Many of the plans give inadequate consideration to alternatives or to their effect on environmental quality.

Poor planning for resource use often results in shoestring development and ribbon blight, rooted in the cities but blasting both residential and farming communities in its path. Premature subdivisions, leap-frogging undeveloped land, disrupt established communities and cause increased costs for public services. Taxation of interspersed farmland usually is disproportionate to benefits received, and often speeds premature abandonment of farming operations. The existence of separate and often-overlapping public jurisdictions adds to the difficulties. Frequently, the result is waste, inefficiency, frustration, as well as disagreeable environmental effects which inhibit favorable economic development and adversely affect the quality of life.

Economic growth also influences changes in rights to resources. This change in turn creates imbalances in the institutional processes of organization and law. Informed decisions depend on knowledge of the legal-economic and organizational structure and the probable effects of alternative courses of public action.

New problems, or new pressures on old problems, generate a need for more detailed information on the availability, quality, and use of our land and

water resources. We need to know the mix of land by qualities used for various purposes, including land being converted to various nonagricultural uses; and we need to know the relative substitutability of one quality of land for another in meeting the uses. Much of the same kind of information is needed in water use planning.

One of the most crucial requirements for improving resource program planning is to strengthen and expedite the process of public decision-making. Success or failure of future policies and programs relating to natural resource management will depend on the form and behavior of organizations that shape public discussion, and on the processes of trade-offs that transform public discussion into public action.

The planning problems facing public agencies concerned with resource development and management involve extensive economic and physical relationships that are extremely difficult to analyze. Short-term and long-range considerations and associated intertemporal problems are inherent. The unsatisfied need for economic information and for more uniform evaluation procedures represents important unfilled needs.

The Division's primary responsibility in the overall issue-area of managing natural resources is to provide economic information and analyses as a basis for improving both public and private decisions. Considering the resources available, the Division does offer substantial help in this regard; yet much more needs to be done. Among the more important research topics within the issue-area that need expanded and immediate attention are the following:

1. Economic and social implications of water resource development, including effects on income and employment, infrastructure of the area developed, evaluation of alternatives, distribution of benefits and costs, and environmental factors.
2. The role of resource use and conservation in rural development.
3. Economics of land use at the rural-urban fringe.
4. Cost sharing: (a) The distributional aspects of cost-sharing for conservation and water resource development, (b) the effects of cost-sharing at alternative levels of Federal financing of water resource development, and (c) cost-sharing policies and techniques in resource management.
5. Impacts of public resource development and conservation programs, particularly as they affect income distribution.
6. The effect of Federal programs on the supply of land and water for agriculture, forestry, and nonagricultural uses.
7. Attitudes of people toward public resource development and control.

8. Resource ownership patterns, and shifts in the distribution of resource ownership, including public and private ownership.
9. Improvements in projection and measurement techniques and in management and analytic systems for resource planning purposes.
10. Technical problems relating to comprehensive or multiple-objective planning, including analyses of the relative merits of comprehensive vs. functional planning in identifying benefits to local, regional, and national interests.
11. The effectiveness of public agency plans and programs in meeting stated objectives (studies designed to help agencies improve program effectiveness).
12. Refine techniques for classifying and measuring resources.

## 2. Enhancement of Environmental Quality

There has been a national groundswell of public concern about the declining quality of our environment. People are demanding an end to further environmental degradation. They want improved standards of environmental quality, more tasteful development of the land, and greater access to recreation opportunities and the natural environment. This concern transcends traditional conservation goals and has stimulated new interest in the public effects of private actions.

Agriculture has major interests in the total environment. It both affects and is affected by levels of environmental quality. Slightly more than half of all pesticide output is used in farming. Pesticides enter the streams and lakes through spraying operations, in runoff from treated areas, or in water discharged by producers. Some pesticide residue remains attached to soil particles in sediment, and is later released at toxic levels of concentration. Application of commercial fertilizers increases the potential for pollution of surface waters by plant nutrients, with subsequent adverse effects on various aspects of the environment. About half of the approximately 4 billion tons of sediment annually washed into streams and lakes comes from agricultural land. Total annual production of animal wastes in the United States is approximately 2 billion tons; trends toward large-scale production systems and concentration of animals in large feedlots have intensified problems of recycling this waste in ways that are acceptable to all segments of society. Dust from field operations, odors from various farm operations, and other farming practices contribute to local environmental degeneration for varying periods and in diverse locations.

Environmental degradation in rural areas is not caused by agriculture alone. Society and industry also create conditions detrimental to agriculture. Air pollution alone is estimated to cost \$500 million or more annually in damages to crops and livestock. Salinization of water may force shifts to lower



yielding, salt-resistant crops. Local ordinances and other types of social restrictions resulting from population shifts toward urban centers frequently inhibit agricultural practices and restrict farm production.

National concern about environmental quality has resulted in establishment of new public programs and reorientation of existing ones. The economic impact of these changes, their effectiveness in environmental enhancement, and their possible adverse effects on various segments of society are not known. Rural people, rural resources, and food and fiber production will be adversely or otherwise affected. The problems of both environmental quality and the actions to ameliorate them are complex and often interrelated.

Federal policy is to help upgrade environmental quality. In addition to its other responsibilities for producing food, feed, fiber, and forest products; maintaining rural income and employment; and providing amenities and services to farm families, the USDA is actively cooperating in programs to protect and improve the quality of the environment.

A strategy for research and program management on environmental problems must recognize the demands being made on the environment--for desirable living space, adequate supplies of food and water, clean air, adequate supplies of raw materials, and an esthetically pleasing countryside. Programs must also support actions designed to minimize pollution hazards. Intensified assessments of causes and effects of environmental degradation are needed to prevent undetected significant damages or erroneous conclusions and actions. A variety of studies are needed to support the Department's policy of directing its program so as to manage the environment for the widest range of uses compatible with environmental quality objectives.

Research questions of concern to the Division in this issue area focus on problems of population distribution, the use of space, and the "good and bad" effects from resource uses. Since "quality" is a subjective concept, inventories of specific situations frequently are needed before analyses of established standards can proceed. The central core of the Division's concern is the incidence of benefits and costs associated with efforts to improve the environment.

The research topics summarized below indicate the variety and complexity of research needed to provide information for sound future programs of environmental enhancement:

1. The resource use and socio-economic effects associated with urbanization, population decentralization, new town developments, and other forms of population distribution.
2. Identification and measurement of environmental and other nonmarket values associated with natural resource uses.
3. The role of government, organizations, and public investment in producing environmental quality.



4. The economic and environmental rationale for locating industries and population on lands less suited for agriculture.
5. The social and economic effects of alternative pollution, waste, and degradation control measures.
6. Use of natural resources for sustaining environmental quality and maintaining acceptable levels of agricultural and industrial growth.
7. Types of controls that might be used by local and State governments to guide economic growth and maintain environmental quality in rural areas.
8. Equity considerations in the distribution of benefits and costs of programs to improve environmental quality.
9. Organizational arrangements and legal techniques to facilitate multi-objective land use planning and implementation.
10. Evaluation techniques and procedures for agency use to identify trade offs, externalities, and residual effects to improve comprehensive planning.

### The Next Steps

The work of Division personnel on the task force reports and the issue statements discussed in previous sections generated a large number of research ideas. Some of these ideas have already been conceptualized as research proposals. Others are being formalized as proposals.

Some of the more promising proposals are now under consideration as modifications or realignments to elements of the Division's current program. Some represent new research concerns and may eventually form the basis for program expansion and requests for additional funding.

### The Need for Balance in Planning

The task of planning ahead must always face the hazards of looking into the future. In this vein, one of the most difficult problems to solve is characterized by the dilemma between too little or too much planning. Either extreme is, of course, undesirable. Too little planning implies a program that is either wholly stable or drifting aimlessly. Too much planning suggests a program that is overly flexible and also adrift.

Program stability is a virtue if it leads to the pursuit of research in depth and otherwise builds competence. But too much stability can mean failure to sense emerging issues and problems and to develop appropriate responses. And it can lead toward ossification of staff into tightly defined niches.

Flexibility can also be a virtue when it means building a dynamic capability for remaining current and relevant. But too much flexibility can lead to a program without central direction--no changes are permitted to persist long enough to be called a direction. This can lead to a basic shallowness in program elements, simply because the concentration necessary to develop expertise is ruled out by frequent program changes. And this, too, is wasteful of staff talent.

The central challenge, then, is to steer a balanced course between no planning and too much planning, and between stability and flexibility.

The Division recognizes that no organization will ever satisfactorily solve this problem in an optimum sense. Yet the problem must be recognized and efforts must be made toward seeking optimal program balance.

#### Shortfalls--The Interface Between Needs and Capabilities

The shortfall between what can be done and what ought to be done is perhaps the most serious problem in providing economic intelligence concerning the use of natural resources. The enormity of the problems pressing in upon society and the requirements for pertinent information, as outlined in the Issue section of this report, suggests the need for a quantum increase in these areas of work.

An examination of the interface between needed work in resource economics and capabilities (as represented by resources committed to this work) reveals a significant gap. In the Division's case, current resources will permit only a few of the most pressing issue questions to be brought under study within the near future. Yet, because of the crucial nature of these issues and their significance to large segments of society, additional attention is imperative. It is hoped that the near future will see an expansion of the Division's resource base in response to these needs.

Working toward the goal of developing a more effective and timely flow of objective information to underpin decisions on the use of natural resource could lead to an enlightened reformulation of critical public policy issues. It could have a desirable synergistic effect on relevant public agencies, institutions of higher education, and private entities charged or concerned with solving social problems within these issues. And it could result in a much needed increase in the levels of personal satisfactions and a new sense of purpose among individuals who wish to contribute in meaningful ways to the solutions of social problems. The Natural Resource Economics Division is pledged to work toward this goal.



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